BAYOUS PETIT ANSE, TIGRE, AND CARLIN, LA.

LETTER

FROM

THE SECRETARY OF THE ARMY

TRANSMITTING

A LETTER FROM THE CHIEF OF ENGINEERS, DEPARTMENT OF THE ARMY, DATED MARCH 25, 1958, SUBMITTING A REPORT, TOGETHER WITH ACCOMPANYING PAPERS AND ILLUSTRATIONS, ON A REVIEW OF REPORTS ON BAYOUS PETIT ANSE, TIGRE, AND CARLIN, LA., REQUESTED BY A RESOLUTION OF THE COMMITTEE ON PUBLIC WORKS, UNITED STATES SENATE, ADOPTED MARCH 24, 1954

MAY 7, 1958.—Referred to the Committee on Public Works and ordered to be printed with two illustrations

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APPENDIXES ACCOMPANYING THE REPORT OF THE DISTRICT ENGINEER

(Appendix A not printed)

ILLUSTRATIONS ACCOMPANYING THE REPORT OF THE DISTRICT ENGINEER

LETTER OF TRANSMITTAL

DEPARTMENT OF THE ARMY,
Washington, D. C., April 30, 1958.

Hon. DENNIS CHAVEZ,
Chairman, Committee on Public Works,
United States Senate.

DEAR MR. CHAIRMAN: I am transmitting herewith a favorable report dated March 25, 1958, from the Chief of Engineers, Department of the Army, together with accompanying papers and illustrations, on a review of reports on Bayous Petit Anse, Tigre, and Carlin, La., requested by a resolution of the Committee on Public Works, United States Senate, adopted March 24, 1954.

In accordance with section 1 of Public Law 14, 79th Congress, the views of the State of Louisiana are set forth in the enclosed communication, together with the views of the Department of the Interior in accordance with Public Law 732, 79th Congress. The reply of the Chief of Engineers to the Secretary of the Interior is also enclosed.

The Bureau of the Budget advises that there is no objection to the submission of the report to the Congress; however, it states that no commitment can be made at this time as to when any estimate of appropriation would be submitted for construction of the project, if authorized by the Congress, since this would be governed by the President's budgetary policies as determined by the then prevailing fiscal situation. A copy of the letter from the Bureau of the Budget is enclosed.

Sincerely yours,

WILBER M. BRUCKER,
Secretary of the Army.

COMMENTS OF THE BUREAU OF THE BUDGET

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D. C., April 18, 1958.

The honorable the SECRETARY OF THE ARMY.

MY DEAR MR. SECRETARY: Assistant Secretary Short's letter of April 4, 1958, submitted the proposed report of the Chief of Engineers on a review of reports on Bayous Petit Anse, Tigre, and Carlin, La., requested by a resolution of the Senate Committee on Public Works adopted on March 24, 1954.

The Chief of Engineers recommends, subject to certain conditions of local cooperation, modification of the existing project for Bayous Petit Anse, Tigre, and Carlin, La., to provide for a channel in the Avery Canal 7 feet deep at mean low gulf level over a bottom width of 60 feet; and a mooring area along the right bank of Bayou Carlin

below the south edge of Delcambre 9 feet deep at mean low gulf level, about 1,300 feet long, with a width varying from about 200 feet to 125 feet; at an estimated cost to the United States of $106,000 for construction and $10,000 annually for maintenance in addition to that now required.

I am authorized by the Director of the Bureau of the Budget to advise you that there would be no objection to the submission of the report to the Congress. No commitment, however, can be made at this time as to when any estimate of appropriation would be submitted for construction of the project, if authorized by the Congress, since this would be governed by the President's budgetary policies as determined by the then prevailing fiscal situation.

Sincerely yours,

CARL H. SCHWARTZ, Jr.,
Chief, Resources and Civil Works Division.

COMMENTS OF THE STATE OF LOUISIANA

STATE OF LOUISIANA,
DEPARTMENT OF PUBLIC WORKS,
Baton Rouge, March 18, 1958.

Gen. J. L. PERSON,
United States Army,
Assistant Chief of Engineers for Civil Works,
Office of the Chief Engineer, Washington, D. C.

DEAR GENERAL PERSONS: Reference is made to your letter of March 5, 1958, and the prior communication from the Chief of Engineers dated October 24, 1957, concerning a review of reports on Bayous Petit Anse, Tigre, and Carlin, La., submitted by the United States Army Engineer District, Corps of Engineers, New Orleans, La., dated February 21, 1957.

In the interest of orderly development of the vast resources of the coastal region of Louisiana, I can only again support the statements contained in the brief of the Louisiana Department of Public Works, a copy of which is enclosed, outlining the desirable improvements of Bayous Petit Anse, Tigre, and Carlin. However, your favorable report on a part of the improvements is appreciated.

No further comment upon the subject report is offered. Thanks again for the favorable consideration of the items approved.

Yours very truly,

LORRIS M. WIMBERLY, *Director.*

COMMENTS OF THE DEPARTMENT OF THE INTERIOR

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D. C., January 15, 1958.

Maj. Gen. E. C. ITSCHNER,
Chief of Engineers,
Department of the Army, Washington, D. C.

DEAR GENERAL ITSCHNER: This is in reply to your letter of October 24 transmitting to this Department for comment copy of your proposed report, together with the reports of the Board of Engineers for Rivers

and Harbors and of the district and division engineers on a review of reports on Bayous Petit Anse, Tigre and Carlin, La.

Your report recommends enlargement of Avery Canal to a 7-foot depth over a bottom width of 60 feet, and the provision of a mooring area along the right bank of Bayou Carlin near Deleambre at an estimated cost to the United States of $106,000.

The United States Fish and Wildlife Service requests that close coordination with the Service and the Louisiana Wildlife and Fisheries Commission be maintained during final planning and construction to insure that spoil is deposited in a manner most favorable to wildlife.

The opportunity of commenting on this report is appreciated.

Sincerely yours,

FRED G. AANDAHL,
Assistant Secretary of the Interior.

LETTER TO THE SECRETARY OF THE INTERIOR

DEPARTMENT OF THE ARMY,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, D. C., January 24, 1958.

The honorable the SECRETARY OF THE INTERIOR.

DEAR MR. SECRETARY: Reference is made to the letter of the Assistant Secretary of the Interior of January 15, 1958, commenting on the proposed report on Bayous Petit Anse, Tigre, and Carlin, La.

You may be assured that if the improvements recommended in this report are authorized, the Fish and Wildlife Service and the Louisiana Wildlife and Fisheries Commission will be consulted during the planning stage of the project to insure that spoil is deposited in a manner commensurate with the primary purposes of the improvement and sound conservation practices.

Sincerely yours,

E. C. ITSCHNER,
Major General, USA,
Chief of Engineers.

BAYOUS PETIT ANSE, TIGRE, AND CARLIN, LA.

REPORT OF THE CHIEF OF ENGINEERS, DEPARTMENT OF THE ARMY

DEPARTMENT OF THE ARMY,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, D. C., March 25, 1958.

Subject: Bayous Petit Anse, Tigre, and Carlin, La.
To: The Secretary of the Army

1. I submit for transmission to Congress the report of the Board of Engineers for Rivers and Harbors in response to the resolution of the Committee on Public Works of the United States Senate adopted March 24, 1954, requesting the Board to review the report on Bayous Petit Anse, Tigre, and Carlin, La., printed in House Document 594, 78th Congress, 2d session, and other reports, with a view to determining the advisability of modifying the existing project in any way at this time.

2. The Board, after full consideration of the reports of the district and division engineers, concludes that enlargement of Bayous Petit Anse, Tigre, and Carlin, as requested by local interests, is not justified by the present and prospective needs of navigation. The Board believes that the plans proposed by the district engineer for enlargement of the Avery Canal and construction of a mooring area at Delcambre are adequate for the needs of navigation and that the requirements of local cooperation are appropriate.

3. Accordingly, the Board recommends modification of the existing project for Bayous Petit Anse, Tigre, and Carlin, La., to provide for a channel in the Avery Canal 7 feet deep at mean low gulf level over a bottom width of 60 feet; and a mooring area along the right bank of Bayou Carlin below the south edge of Delcambre 9 feet deep at mean low gulf level, about 1,300 feet long, with a width varying from about 200 feet at the upstream end to 125 feet at the downstream end; generally in accordance with the plans of the district engineer and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable; at an estimated cost to the United States of $106,000 for construction and $10,000 annually for maintenance in addition to that now required; provided local interests agree to (*a*) furnish without cost to the United States all lands, easements, rights-of-way, and spoil-disposal areas necessary for construction of the project and for subsequent maintenance, when and as required; (*b*) hold and save the United States free from damages due to the construction and maintenance of the project; (*c*) provide without cost to the United States necessary mooring facilities and an access roadway, in accordance with plans approved by the Chief of Engineers; (*d*) make all necessary alterations to buildings and utilities; (*e*) estab-

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lish a competent and properly constituted public body empowered to regulate the use and development of the mooring area with the understanding that it will be open to all on equal terms; and (*f*) maintain and operate the mooring area and its facilities, including maintenance dredging between the realined channel and the mooring facilities.

4. After due consideration of these reports, I concur in the views and recommendations of the Board.

E. C. Itschner,
Major General, United States Army,
Chief of Engineers.

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

Corps of Engineers, United States Army,
Board of Engineers for Rivers and Harbors,
Washington, D. C., September 25, 1957.

Subject: Bayous Petit Anse, Tigre, and Carlin, La.
To: The Chief of Engineers, Department of the Army.

1. This report is submitted in response to the following resolution adopted March 24, 1954:

Resolved by the Committee on Public Works of the United States Senate, That the Board of Engineers for Rivers and Harbors, created under section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby, requested to review the report on Bayous Petit Anse, Tigre, and Carlin, Louisiana, printed in House Document Numbered 594, Seventy-eighth Congress, second session, and other reports, with a view to determining the advisability of modifying the existing project in any way at this time.

2. Bayous Petit Anse, Tigre, and Carlin are in the coastal area of south Louisiana. They are connected to the Gulf of Mexico by Vermilion Bay and its outlet, Southwest Pass, and to the Mississippi River and other coastal waterways by the 12- by 125-foot Gulf Intracoastal Waterway. Bayou Petit Anse rises 5 miles west of New Iberia, La., and flows southward 15 miles to its intersection with the Gulf Intracoastal Waterway; thence it flows westerly 3 miles to Vermilion Bay. Its main tributary, Bayou Carlin, flows southeastward from Lake Peigneur 7.6 miles to join Bayou Petit Anse 2.3 miles above the Gulf Intracoastal Waterway. Bayou Tigre, a main tributary of Bayou Carlin, originates at the town of Erath, La., and flows southeastward 6 miles to join Bayou Carlin 3.3 miles above its mouth. The combined drainage area of the bayous is about 140 square miles. Avery Canal, also called McIlhenny Canal, is an artificial navigation channel extending from Bayou Petit Anse immediately south of the Intracoastal Waterway about 2 miles in a southerly direction to Weeks Bay, an arm of Vermilion Bay. In October 1955, the controlling depths of the waterways, at mean low gulf level, were: Bayou Petit Anse for a distance of 6 miles above the Intracoastal Waterway, 11 feet; Bayou Carlin, 6 feet; Avery Canal, 5 feet; and Bayou Tigre, 4 feet. Vermilion Bay has a general depth of 7 to 9 feet. The mean tidal range in the waterways is about 10 inches. The existing Federal project provides for channels having depths below mean low gulf level and bottom width, all in feet, as follows: Bayou Petit Anse, 9 by 80 from the Intracoastal Waterway to the north end of Avery Island, a distance of about 6.1 miles; Bayou Carlin, 9 by 80 from Lake Peigneur to its mouth, about 7.6 miles;

and Avery Canal, 5 by 40 from the Intracoastal Waterway into Vermilion Bay, a distance of 2.4 miles. The existing project also provides for protection at Federal expense of the piers of the railroad bridge over Bayou Carlin at Delcambre, La. The project was completed in 1949. Total costs to the United States to June 30, 1956, were $456,230, of which $298,314 was for new work and $157,916 was for maintenance. The estimate for annual maintenance is $15,000, which consists of $5,000 for Bayou Petit Anse, $7,000 for Bayou Carlin, and $3,000 for Avery Canal. Local interests have provided access channels to the salt mines at Avery Island on Bayou Petit Anse and at Jefferson Island on Bayou Carlin and have constructed a public wharf at Avery Island adequate for general commerce at that point. Boat repair facilities, ice plants, and seafood packing houses, located at Delcambre, all have privately owned terminal facilities adequate for their needs.

3. The tributary area is basically the area drained by the bayous. There are no large towns in the area, the 1950 population of the urban centers served by the bayous being: Avery Island, 500; Jefferson Island, 500; Erath, 1,514; and Delcambre, 1,463. The principal products of the area are sugar, rice, salt, petroleum, natural gas, and seafood. From 1950 to 1955, inclusive, traffic over the bayous averaged about 1,157,000 tons, of which about 1,111,000 were on Bayou Petit Anse, 41,000 were on Bayou Carlin, and 5,000 were on Bayou Tigre. During the same period there was an annual average of about 6,360 vessel trips uniformly distributed by years but predominantly over Bayous Petit Anse and Carlin. About 98 percent of the vessel trips were by vessels having drafts of 9 feet and less.

4. Local interests have requested improvements as follows:

(*a*) Enlargement of the existing project channels on Bayous Petit Anse and Carlin to a depth of 12 feet and a width of 125 feet, and an increase in the horizontal clearance of the 2 bridges over Bayou Carlin at Delcambre to 100 feet. They claim these improvements are needed so that 50- and 52-foot barges having 9-foot draft operating on the Intracoastal Waterway can efficiently, adequately, and safely maneuver in and out of the feeder channels.

(*b*) Enlargement of Bayou Tigre downstream from the railroad bridge near Erath to a depth of 9 feet and a width of 80 feet. This improvement is needed for water transportation of sugar and sugarcane to and from the sugar mill at Erath.

(*c*) Relocation of the Avery Canal and provision of a channel 9 feet deep and 60 feet wide from the Intracoastal Waterway to Vermilion Bay, on the basis that it would be a shorter route to the gulf and could be maintained with less effort and cost than an improved channel at the existing location. They claim that the shallow depths at the ends of the canal cause excessive damage to vessels and loss of time which would be reduced or eliminated by provision of a 9-foot depth.

(*d*) Construction of a small-boat harbor, or anchorage, at Delcambre of sufficient dimensions to safely moor 400 vessels up to trawler size. Local interests state that during periods of storm warnings in the gulf, which average about 27 per year, many shrimp vessels from other ports travel to Delcambre to market their catch, to await favorable weather, and to replenish supplies for the next trip to the gulf. In addition to serving as a harbor of refuge, Delcambre is the only port between Morgan City and Lake Charles where shrimpers can market

their catch. During these periods of inclement weather as many as 460 small boats have been moored at Delcambre, at least 300 of which were not locally owned or operated. Due to limited mooring facilities at Delcambre, the fishing boats during these periods are tied two or more abreast along Bayou Carlin, creating hazards and frequent delays to barge traffic.

5. The district engineer finds that enlargement of Bayous Petit Anse, Tigre, and Carlin, to serve existing and prospective commerce, is not justified at this time. He further finds that the advantages of enlargement of the existing Avery Canal outweigh those of the relocation suggested by local interests. Because the controlling depth in Vermilion Bay is about 7 feet, he finds that enlargement of Avery Canal to a 7-foot depth over a bottom width of 60 feet will serve the needs of present and prospective traffic. He estimates the initial cost at $41,000, based on prices in the fall of 1956. The annual carrying charges would be $11,440, of which $10,000 would be for maintenance in addition to that now required. The average annual benefits are estimated at $26,300, consisting of $15,000 from reduction in damages to vessels and $11,300 from reduction in delays. The benefit-cost ratio is 2.3. For the anchorage area at Delcambre, the district engineer finds that suitable space can be provided along the right bank immediately south of the town by straightening a bend in Bayou Carlin and utilizing the existing channel and the intervening area between the channels for moorage. The area thus provided would be about 1,300 feet long, tapering in width from about 200 feet at the upper end to 125 feet at the lower end. Approximately 150 boats up to trawler size could be moored off the barge channel in the area. He estimates the first cost of this improvement at $107,000, of which $65,000 would be Federal and $42,000, non-Federal. The annual charges would be $9,430, of which $2,300 would be Federal and $7,130 would be non-Federal, including $5,700 for maintenance. The average annual benefits are estimated at $20,000, consisting entirely of elimination of cost of travel for 140 shrimp boats. The benefit-cost ratio is 2.1. The district engineer recommends modification of the existing project to provide for enlargement of Avery Canal to a depth of 7 feet at mean low gulf level over a bottom width of 60 feet and construction of a harbor of refuge at Delcambre at an estimated first cost to the United States of $106,000 and an estimated annual maintenance cost of $10,000 in addition to that required for the existing project, subject to certain conditions of local cooperation. The division engineer concurs.

6. The President of the Beach Erosion Board indicates that increasing the project dimensions of the Avery Canal will not significantly change existing shorelines in Vermilion Bay.

7. Local interests were notified of the recommendations of the reporting officers and were given an opportunity to present additional information to the Board. No communications have been received.

VIEWS AND RECOMMENDATIONS OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

8. The Board of Engineers for Rivers and Harbors concurs in the views and recommendations of the reporting officers. It agrees that enlargement of Bayous Petit Anse, Tigre, and Carlin is not justified at this time. It notes that any plan for deepening of Avery Canal

is limited by the controlling depth of 7 feet in Vermilion Bay. It is therefore of the opinion that the enlargement of Avery Canal proposed by the district engineer will suitably serve the needs of existing and prospective navigation. It is further of the opinion that the mooring area proposed by the district engineer at Delcambre is needed. It will serve as a harbor of refuge and eliminate the existing hazard to barge traffic on Bayou Carlin. The improvements are economically justified and the requirements of local cooperation are appropriate.

9. The Board therefore recommends modification of the existing project for Bayous Petit Anse, Tigre, and Carlin, La., to provide for a channel in the Avery Canal 7 feet deep at mean low gulf level over a bottom width of 60 feet; and a mooring area along the right bank of Bayou Carlin below the south edge of Delcambre 9 feet deep at mean low gulf level, about 1,300 feet long, with a width varying from about 200 feet at the upstream end to 125 feet at the downstream end; generally in accordance with the plans of the district engineer and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable; at an estimated cost to the United States of $106,000 for construction and $10,000 annually for maintenance in addition to that now required; provided local interests agree to (*a*) furnish without cost to the United States all lands, easements, rights-of-way, and spoil-disposal areas necessary for construction of the project and for subsequent maintenance, when and as required; (*b*) hold and save the United States free from damages due to construction and maintenance of the project; (*c*) provide without cost to the United States necessary mooring facilities and an access roadway, in accordance with plans approved by the Chief of Engineers; (*d*) make all necessary alterations to buildings and utilities; (*e*) establish a competent and properly constituted public body empowered to regulate the use and development of the mooring area with the understanding that it will be open to all on equal terms; and (*f*) maintain and operate the mooring area and its facilities, including maintenance dredging between the realined channel and the mooring facilities.

For the Board:

CHAS. G. HOLLE,
Major General, USA, Chairman.

REPORT OF THE DISTRICT ENGINEER

SYLLABUS

Navigation interests requested modification of the existing project to provide the following:

Bayou Carlin—a 12 by 125-foot project from its junction with Bayou Petit Anse to Lake Peigneur, with alteration of the 2 bridges across the bayou to provide a horizontal clearance of 100 feet.

Bayou Carlin—a boat harbor, or harbor of refuge, in the vicinity of Delcambre, La., for shrimping vessels.

Bayou Petit Anse—a 12 by 125-foot project from the Intracoastal Waterway to the northern end of Avery Island.

Bayou Tigre—a 9 by 80-foot channel from its junction with Bayou Carlin to the railroad bridge at Erath, La.

Avery Canal (also known as McIlhenny Canal)—the enlargement of the channel to a 9 by 60-foot waterway and the relocation of the channel.

The district engineer concludes that the provision of a harbor of refuge at Delcambre, La., and the enlargement of Avery Canal to provide a 7 by 60-foot channel are justified. The further enlargement of the channel in Bayous Petit

Anse and Carlin is not justified by the present or reasonably prospective tonnage. Likewise, any enlargement of Bayou Tigre is without economic justification.

The estimated cost to the United States for the harbor of refuge in Bayou Carlin at Delcambre, La., is $65,000 for initial construction. The improvement to Avery Canal is estimated to cost the United States $41,000 for initial construction and $10,000 for annual maintenance over that necessary for the existing project.

The district engineer believes that the benefits to commercial fishing and navigation as a result of decreased loss of time and decreased damages justify the improvement.

United States Army Engineer District, New Orleans Corps of Engineers

New Orleans 9, La., *February 21, 1957.*

Subject: Review of reports on Bayous Petit Anse, Tigre, and Carlin, La.

Through: The Division Engineer, United States Army Engineer Division, Lower Mississippi Valley, Vicksburg, Miss.

To: The Chief of Engineers, Department of the Army, Washington, D. C.

AUTHORIZATION, PURPOSE, AND SCOPE

1. *Authority.*—This report is submitted in compliance with the resolution of the Committee on Public Works of the United States Senate, adopted on March 24, 1954, which reads as follows:

Resolved by the Committee on Public Works of the United States Senate, That the Board of Engineers for Rivers and Harbors, created under section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby, requested to review the report on Bayous Petit Anse, Tigre, and Carlin, Louisiana, printed in House Document Numbered 594, Seventy-eighth Congress, second session, and other reports, with a view to determining the advisability of modifying the existing project in any way at this time.

2. *Scope of study.*—The report being reviewed, House Document 594, 78th Congress, 2d session, is a survey report. This review is also of survey scope. Office studies were made of prior reports on this waterway; cross sections; profiles; and condition surveys of the waterway taken by fathometer; aerial photo map of the basin; and commercial statistics. The Louisiana Department of Public Works conducted and submitted on April 11, 1956, a field survey for a proposed relocation of Avery Canal, which was also used in the preparation of this report. The following agencies and interested parties were consulted in connection with this report:

The State of Louisiana, Department of Public Works
The Louisiana Wild Life and Fisheries Commission
The United States Fish and Wildlife Service
The Commandant, Eighth Naval District

3. *Reports reviewed.*—(*a*) House Document 225, 72d Congress, 1st session: This document is the basis for the original project adopted by the River and Harbor Act approved August 30, 1935. It provides for a channel 60 feet wide and 9 feet deep in Bayou Petit Anse from the Intracoastal Waterway to a point 3.2 miles upstream, thence 40 feet wide and 5 feet deep to the highway bridge at Avery Island; and a channel 40 feet wide and 5 feet deep in Bayou Carlin from Bayou Petit Anse to Lake Peigneur, subject to stipulated conditions of local cooperation.

(*b*) Rivers and Harbors Committee Document 40, 75th Congress, 1st session, adopted by the River and Harbor Act of August 26, 1937,

recommended that no change be made in the existing project for Bayou Carlin; that the project for Bayou Petit Anse be modified to provide for the enlargement of this bayou from the Intracoastal Waterway to a point 3.2 miles upstream to a depth of 9 feet over a bottom width of 80 feet; that the channel constructed by local interests to the head of Avery Island be maintained at a section 9 feet by 80 feet; and that a channel 5 feet deep and 40 feet wide be constructed in the McIlhenny Canal from the Intracoastal Waterway to the appropriate depth contour in Vermilion Bay, provided local interests furnish rights-of-way and suitable disposal areas necessary for construction and subsequent maintenance.

(*c*) House Document 594, 78th Congress, 2d session, adopted by the River and Harbor Act of March 2, 1945, recommended that the project for Bayous Petit Anse, Tigre, and Carlin, La., be modified to provide a channel in Bayou Carlin, 9 feet deep by 80 feet wide, from Bayou Petit Anse to Lake Peigneur; provided that local interests furnish, without cost to the United States, all lands, easements, rights-of-way, and suitable spoil-disposal areas necessary for construction and subsequent maintenance, and furnish assurances satisfactory to the Secretary of War that they will provide, without cost to the United States, a 9-foot by 80-foot channel from Bayou Carlin to the salt mine of the Jefferson Island Salt Co.

DESCRIPTION

4. *Description of navigation conditions.*—(*a*) Bayous Petit Anse, Tigre, and Carlin are located in the coastal area of south Louisiana. They are connected to the Gulf of Mexico through Vermilion Bay and its outlet Southwest Pass. Connections to the Mississippi River and other coastal waterways are provided by the 12 by 125-foot Gulf Intracoastal Waterway which extends from Florida to the Mexican border.

(*b*) Bayou Petit Anse rises about 5 miles west of New Iberia and flows in a general southerly direction about 15 miles to its intersection with the Intracoastal Waterway; thence it flows westerly about 3 miles to Vermilion Bay.

(*c*) Avery Canal, also called McIlhenny Canal, is an artificial navigation channel extending from Bayou Petit Anse just below the Intracoastal Waterway about 2 miles in a southerly direction to Weeks Bay, an arm of Vermilion Bay.

(*d*) Bayou Carlin originates at Lake Peigneur and flows southeasterly for 7.6 miles to its confluence with Bayou Petit Anse at a point about 2.3 miles above the Intracoastal Waterway.

(*e*) Bayou Tigre flows southeasterly for approximately 6 miles from Erath, to its junction with Bayou Carlin 3.3 miles above Bayou Petit Anse. From its mouth to the Southern Pacific Railroad bridge at mile 6.4, the width of the stream varies between 50 and 90 feet, and central depths vary from 3 to 7 feet.

(*f*) The combined drainage area of Bayous Petit Anse, Tigre, and Carlin, approximately 140 square miles, is located in Iberia, Lafayette, and Vermilion Parishes between the Bayou Teche and Vermilion River drainage basins.

(*g*) The ground elevations of the area drained by these streams range from 35 feet in the north to 2 feet in the south where the uplands

merge with the coastal marsh. Elevations in the marsh area range from 0.5 to 2 feet. About two-thirds of the area drained is uplands and about one-third is coastal marsh.

(*h*) In these bayous, the normal range of tide is 10 inches; however, the water surface may be depressed from 1 to 2 feet below normal during periods of protracted northerly winds. Hurricanes in the Gulf of Mexico, may, under extreme conditions, cause tides as much as 10 feet above normal.

(*i*) The controlling depths of the existing waterways (October 1955) at mean low gulf level are as follows: Bayou Carlin, 6.0 feet; Bayou Petit Anse for a distance of 6 miles above the Gulf Intracoastal Waterway, 11.0 feet; and Avery Canal from the Gulf Intracoastal Waterway to Vermilion Bay 5.0 feet and over the bar in Weeks Bay, 5.0 feet. Vermilion Bay has a general depth of approximately 7 to 9 feet.

5. *Tributary area.*—(*a*) The tributary area is basically the same as the area drained by these bayous. Its northern section is fertile agricultural land used mostly for cultivation of sugarcane and rice. The southern section is predominantly coastal marsh used for trapping and cattle grazing. There are no large towns in the area. The population in 1950 of the urban centers served by these bayous follows:

Avery Island	500
Jefferson Island	500
Erath	1,514
Delcambre	1,463

(*b*) The population of the parishes in which the drainage area of these streams is located is Lafayette Parish 57,743; Iberia Parish 40,059; and Vermilion Parish 36,929. The parish seats of these parishes are Lafayette, New Iberia, and Abbeville, with populations of 33,541; 16,467; and 9,338 respectively.

(*c*) This locality is the center of gulf coastal salt production. Avery Island, on the east bank of Bayou Petit Anse at about mile 6.0, is a salt dome which rises to an elevation of approximately 120 feet above the surrounding marsh. Jefferson Island, at the head of Bayou Carlin, is a similar formation though of slightly less elevation. Both are operated commercially, and produced approximately 450,000 tons in 1955. These deposits produce salt of the highest quality, and present production represents about 2.5 percent of the total production of the United States. Salt has been produced here almost continuously since 1867 and the supply is sufficient to last for hundreds of years at the present rate of production.

(*d*) Oysters and shrimp are taken from the waters of Vermilion Bay and shrimp are also taken from the adjacent open waters of the Gulf of Mexico. There are 7 shrimp and seafood packing plants, 3 ice plants, 4 boat fuel stations, and 2 major boat repair establishments operating at Delcambre. This town is used by local fishing boats as a base of operations. Boats are repaired, maintained, and supplied here and the seafood catches are disposed of, processed, and packed. Bayou Carlin at Delcambre is also used in case of bad weather as a harbor of refuge by fishing boats from other ports when operating in this section of the Gulf of Mexico. As many as 460 boats have been moored near Delcambre during severe weather, of which at least 300 were not locally owned or operated.

(*e*) Sugar mills are located at Broussard, Youngsville, and Erath. Oil has been produced in the area since 1938. Jefferson Island, Erath,

Tigre Lagoon, South Tigre Lagoon, and Avery Island are oilfields located within the drainage area of the subject streams.

(*f*) The upland area is served by an adequate system of improved highways. Branch lines of the Southern Pacific Railroad and the Missouri Pacific Railroad also serve the northern section. No transportation arteries traverse the coastal marsh area.

(*g*) Sugarcane and sugar are moved by railroads and highways, the salt by railroads and waterways, the oil principally by pipelines, seafoods from the producing areas to packing plants at Delcambre by water, and seafood from the packing plants to markets by highways and railroads. Oilfield supplies are also being moved into the area for distribution by water.

6. *Bridges affecting navigation.*—Bridges across the bayous are as follows:

Miles above mouth	Clearance (feet)		Type	Owner	Date built	Constructed under permit dated
	Horizontal	Vertical (mean low water)				
BAYOU PETIT ANSE [1]						
8.0	-------	-------	Fixed------	Louisiana Highway Commission.	-------	-------
8.3	33	6.9	----do-----	Southern Pacific Lines-----	-------	-------
9.6	-------	-------	----do-----	Louisiana Highway Commission.	-------	-------
BAYOU CARLIN						
6.4	40.7	Closed 2.8 Open 49.7	Vertical lift-	Southern Pacific Lines-----	Feb. 6, 1939	Jan. 19, 1935
6.4	40.7	Closed 5.0 Open 47.0	----do----	Louisiana Highway Commission.	Sept. 21, 1935	Do.
BAYOU TIGRE [2]						
2.3	40.0	7.3	Baseule----	Vermilion Parish----	-------	-------
3.2	15.0	5.4	----do-----	----do-----	-------	-------
4.6	17.6	6.0	----do-----	----do-----	-------	-------
6.0	20.0	6.0	Fixed------	----do-----	-------	-------

[1] Miles above the Intracoastal Waterway. (These bridges are above head of existing Federal project.)
[2] There is no Federal project on this stream.

7. *Prior reports.*—Prior reports on these bayous are as follows:

Bayou	Type	Date [1]	Published in	Recommendation
Petit Anse------	Preliminary examination.	Jan. 27, 1883	S. Ex. Doc. 30, 48th Cong., 1st sess.	Unfavorable.
Carlin----------	----do----------	Aug. 14, 1891	Annual Report, Office of Chief of Engineers, 1891.	Do.
Tigre----------	----do----------	Sept. 20, 1902	H. Doc. 192, 58th Cong., 2d sess---	Do.
Do----------	----do----------	Feb. 23, 1921	Not published----------	Do.
Petit Anse, Tigre, and Carlin.	----do----------	Dec. 31, 1930	H. Doc. 225, 72d Cong., 1st sess---	[2].
Do----------	Survey----------	Aug. 15, 1931	----do----------	[2].
Do----------	Review of survey scope.	May 25, 1937	River and Harbor Committee Doc. 40, 75th Cong., 1st sess.	[2].
Do----------	----do----------	Apr. 15, 1944	H. Doc. 594, 78th Cong., 2d sess---	[3].

[1] Date submitted by reporting officer.
[2] Favorable for Bayou Petit Anse and Carlin; unfavorable for Bayou Tigre.
[3] Favorable for Bayou Carlin; unfavorable for Bayous Petit Anse and Tigre.

8. *Existing Corps of Engineers' projects.*—(*a*) The existing Corps of Engineers' project "Petit Anse, Tigre, and Carlin Bayous, La.," as authorized by the River and Harbor Act of August 30, 1935, and modified by the River and Harbor Acts of August 26, 1937, March 2, 1945, and June 30, 1948, provides for the following improvements:

(1) A channel 9 feet deep at mean low gulf level over a bottom width of 80 feet in Bayou Petit Anse from the Gulf Intracoastal Waterway to the north end of Avery Island, a distance of about 6.1 miles.

(2) A channel 9 feet deep at mean low gulf level over a bottom width of 80 feet in Bayou Carlin from its mouth at Bayou Petit Anse to Lake Peigneur, a distance of about 7.6 miles.

(3) A channel 5 feet deep over a bottom width of 40 feet in Avery Canal from the Gulf Intracoastal Waterway to Vermilion Bay.

(4) Protection at Federal expense of the piers of the railroad bridge over Bayou Carlin at Delcambre, La., which was made necessary by construction of the 9- by 80-foot channel in Bayou Carlin.

(*b*) All channel excavation was completed in 1947 and protection of the piers of the railroad bridge was completed in 1949. The total cost of the project to June 30, 1956, was $456,230, of which $298,314 was for new work and $157,916 was for maintenance. The latest approved estimate for annual maintenance is $15,000 (1956) which consists of $5,000 for Bayou Petit Anse, $7,000 for Bayou Carlin, and $3,000 for Avery Canal. This amount is considered adequate for maintenance of the existing project.

9. *Local cooperation on existing and prior projects.*—(*a*) The existing project was authorized subject to the conditions that local interests furnish, free of cost to the United States, all rights-of-way and disposal areas, construct a public terminal at the head of Avery Island, reconstruct all railroad and highway bridges as required, and furnish assurance satisfactory to the Secretary of the Army that they will provide a 9- by 80-foot channel from Bayou Carlin to the Jefferson Island Salt Co. mine.

(*b*) All conditions of local cooperation have been complied with except the provision of a public terminal at the head of Avery Island and the provision of a channel from the Jefferson Island salt mine to Bayou Carlin to the specified dimensions of 9 by 80 feet. A short section of bulkhead adjacent to the highway has been constructed which provides wharfage sufficient for general commerce using Bayou Petit Anse. The Jefferson Island Salt Co. has constructed at 9- by 60-foot channel, from Bayou Carlin to their salt mine, which is adequate for existing traffic.

10. *Other improvements.*—The Texas Pipeline Co. under permit of March 24, 1937, enlarged the 5- by 40-foot channel in Bayou Petit Anse above mile 3.2 to a depth of 9 feet and a width of 80 feet at an approximate cost of $30,000. The Avery Salt Co. dredged a canal from their mine at Avery Island to Bayou Petit Anse at mile 3.3. The entrance channel from Vermilion Bay to Avery Canal was dredged by the State of Louisiana, department of public works, in 1952 to provide a 10- by 40-foot channel. Present depths through the channel are about 5 feet.

11. *Terminal and transfer facilities.*—(*a*) A small timber decked wharf and bulkhead on Bayou Petit Anse at the head of Avery Island, parallel to the highway, is adequate for small boats. The Texas

Pipeline Co. erected a narrow timber wharf at the upper end of Avery Island, of sufficient length to accommodate several barges, with pipe connections to its storage tanks. The Avery Island Salt Co. has erected a wharf and loading conveyor at the upper end of its canal.

(*b*) Boat repair facilities, ice plants, and seafood packinghouses, located at Delcambre, all have privately owned terminal facilities adequate for their needs. The Jefferson Island Salt Co. has provided terminal facilities at its salt mine.

(*c*) All existing terminal facilities are privately owned except the small wharf at the head of Avery Island. Ample space for additional terminal facilities exists. Interchange of freight from water to highways and/or railroads may be accomplished at Jefferson Island, Delcambre, and Avery Island.

PROBLEMS UNDER INVESTIGATION

12. *Improvements desired.*—(*a*) A public hearing was held at Delcambre, La., on February 24, 1956, with an attendance of about 150 persons, representing State, parish, and town officials, fishermen, and other local interests.

(*b*) Local interests through the Louisiana Department of Public Works requested that Bayou Carlin be enlarged to a depth of 12 feet over a width of 125 feet from Bayou Petit Anse to Lake Peigneur; that the horizontal clearance of the 2 bridges that cross the bayou at Delcambre be increased to 100 feet; that a boat harbor be constructed in the vicinity of Delcambre, just off Bayou Carlin; that Bayou Petit Anse be enlarged from the Intracoastal Waterway to the northern end of Avery Island to a depth of 12 feet over a width of 125 feet; that the location of the Avery Canal be changed and the channel be enlarged to a depth of 9 feet over a width of at least 60 feet; and that the existing project be expanded to provide a channel 9 feet deep and 80 feet wide in Bayou Tigre to the railroad crossing near Erath. These requests were supported by town and parish officials present.

(*c*) The representative of the Jefferson Island Co. requested 100 feet horizontal clearance through the 2 bridges that cross Bayou Carlin at Delcambre and a depth of 12 feet for the bayou from Lake Peigneur to the Intracoastal Waterway. He stated that the Jefferson Island Salt Co. is willing to enlarge the canal from Bayou Carlin to the salt mine to match the proposed project dimensions.

(*d*) The representative of the American Waterways Operators, Inc., requested improvements "on Bayous Petit Anse, Tigre, and Carlin to the extent that standard line equipment operating on the main stem can efficiently, adequately, and safely maneuver in and out of this feeder channel. Standard size barges of the many operators have widths of 50 to 52 feet and a draft of 9 feet when properly loaded."

(*e*) Representatives of the town of Delcambre and fishing interests supported the requested improvements with particular emphasis on the need for a larger channel at a new location from Vermilion Bay to Bayou Petit Anse at the Gulf Intracoastal Waterway; the need for a harbor of refuge at Delcambre; the need for directional signs along the waterway from Vermilion Bay to the town of Delcambre; and the enlargement of Bayou Carlin and the openings through the bridges at Delcambre.

(*f*) A summary of the improvements desired, as expressed in the public hearing, follows:

(1) Enlarge Bayou Carlin to a depth of 12 feet and a width of 125 feet from Bayou Petit Anse to Lake Peigneur.

(2) Increase the horizontal clearance of the 2 bridges that cross Bayou Carlin to 100 feet to permit the passage of 50-foot barges.

(3) Construct a boat harbor at Deleambre.

(4) Enlarge Bayou Petit Anse from the head of Avery Island to the Intracoastal Waterway to a depth of 12 feet and a width of 125 feet.

(5) Relocate the Avery (McIlhenny) Canal and provide a channel 9 by 60 feet from the Intracoastal Waterway to Vermilion Bay.

(6) Enlarge Bayou Tigre to a depth of 9 feet and a width of 80 feet from Erath to Bayou Carlin.

There was no opposition expressed to any of these improvements requested.

13. *Existing and prospective commerce.*—(*a*) Commerce on Bayous Petit Anse, Tigre, and Carlin, as shown in annual reports, Chief of Engineers, for the past 10 years, was as follows:

Traffic over Bayous Petit Anse, Tigre, and Carlin

[Quantities in tons of 2,000 pounds]

Commodity	1046	1047	1048	1940	1950
Crude oil	761,316	085,233	1,121,778	1,426,130	1,612,362
Steel products	180	638	776	1,050	220
Machinery	685	1,180	3,562	3,266	2,545
Ice	23	6,033	8,473	7,570	0,015
Seafood	397	475	364	762	275
Gasoline	57,058	60,511	55,610	9,532	3,104
Cement	3,457	335	369	361	
Salt	10,280	34,622	22,030	30,084	35,476
Shells					25,955
Lumber	81		1,040	266	135
Petroleum products	270,241	291,145	300,900	303,137	220,035
Miscellaneous	139	1,377	2,313	323	097
Total	1,103,857	1,381,549	1,518,115	1,784,296	1,916,119

Commodity	1951	1052	1953	1054	1955
Crude oil	1,623,531	1,208,353	268,101	77,933	105,636
Steel products	22	30	6	4,621	38,170
Machinery	165	552	1,225	2,964	2,435
Ice	5,180	4,693	9,742	2,248	1,592
Seafood	1,100	349	1,434	2,725	1,621
Gasoline	36,856	8,147	5,434	10,050	
Cement	8				774
Salt	56,170	58,532	110,607	135,841	170,483
Shells			46,238	2,494	
Lumber	18	30			
Petroleum products	242,703	244,816	206,162	155,639	162,007
Miscellaneous	3	235	23	15	[1] 8,755
Total	1,965,762	1,525,746	648,972	394,530	491,473

[1] Sand and gravel 8,290 tons.

(*b*) The following table shows the traffic over Bayou Carlin and Bayou Tigre since 1949; earlier figures are not available.

Traffic over Bayou Carlin

[Quantities in tons of 2,000 pounds]

Commodity	1949	1950	1951	1952	1953	1954	1955
Crude oil	3,946						
Steel	639	150					26,088
Machinery	248	464	15	438	20	777	1,965
Ice	6,708	8,853	5,085	4,593	9,742	2,248	1,592
Shrimp	762	275	1,035	349	1,383	2,725	1,621
Gasoline	3						
Cement	35						774
Salt				3,935	11,510	43,405	49,495
Shells		11,164			46,238	2,494	
Lumber		131					
Petroleum products		150	7				
Miscellaneous	131	122				15	8,525
Total	12,472	21,309	6,142	9,315	68,893	51,664	90,060

Traffic over Bayou Tigre

[Quantities in tons of 2,000 pounds]

Commodity	1949	1950	1951	1952	1953	1954	1955
Crude oil				13,217			
Steel							
Machinery	100			50			
Ice			1				
Shrimp	10	3	49				
Gasoline							
Cement							
Salt							
Shells		14,104					
Lumber							
Petroleum products							
Miscellaneous	9	3					
Total	119	14,110	50	13,267			

(*c*) Tonnage transported over Bayou Petite Anse, not including cargo over Bayou Carlin, is shown below:

Traffic over Bayou Petite Anse (exclusive of that on Bayou Carlin)

[Quantities in tons of 2,000 pounds]

Commodity	1949	1950	1951	1952	1953	1954	1955
Crude oil	1,422,193	1,612,362	1,623,531	1,208,353	268,101	77,933	105,636
Steel	1,317	70	22	30	6	4,621	12,082
Machinery	3,018	2,081	159	114	1,205	2,187	470
Ice	862	162	101	100			
Shrimp			65		51		
Gasoline	9,529	3,104	36,856	8,147	5,434	10,050	
Cement	326		8				
Salt	30,984	35,476	56,170	54,597	99,097	92,436	120,988
Shells		14,791					
Lumber	266	4	18	39			
Petroleum products	303,137	225,885	242,696	244,816	206,162	155,639	162,097
Miscellaneous	192	875	3	235	23		230
Total	1,771,824	1,894,810	1,959,620	1,516,431	580,079	342,866	401,413

(*d*) No commerce has been transported over Bayou Tigre since 1952. This bayou is very crooked and narrow and is shoaled near its confluence with Bayou Carlin. In addition, Bayou Tigre between its mouth and Erath is crossed by four bridges with little vertical clearance. Prospects for development of tonnage on Bayou Tigre are very poor. The primary source of tonnage cited by the Louisiana Department of Public Works was the Erath Sugar Co., Ltd., which operates a sugar mill at Erath, La. The movement of sugarcane by barge is not likely because of the rehandling necessitated by truck movement at each end. Cane is now loaded in the field into trucks and taken directly to the mill over improved highways. In order for sugar to move advantageously by water it must be consigned to river ports, and in addition the buyer must be in a position to handle the large quantity necessary for barge shipments. These requirements can be met in only a few instances and consequently the prospect of shipment by barge is limited. No apparent reasons exist that would favor the movement of molasses from Erath by barge. Gas and oil are produced near Erath which make the transport of these items for local fuel consumption improbable. Bulk movement of fertilizers would necessitate installation of handling facilities which would be uneconomical for the small tonnage required by a single user.

(*e*) Prior to 1954, crude oil was the major item of commerce over Bayou Petit Anse. Completion of pipelines resulted in a reduction in the tonnage since that time. However, some crude petroleum continues to move on the waterway and future developments will probably offset any tendency to decrease in the future. Shipment of salt from Avery Island has long been established and is increasing in volume. Based on present trends it is estimated that an average movement of 400,000 tons may be expected annually during the life of the project.

(*f*) Practically no petroleum traffic exists on Bayou Carlin. Salt shipments over Bayou Carlin are increasing and will probably amount to 400,000 tons by 1960 and may continue to increase thereafter during the life of the project. Local interests pointed out that the jet base being established by the United States Navy near New Iberia, La., could possibly be supplied with fuel over an improved waterway. Navy representatives at the public hearing did not make any statements relative to the advantage that waterway transportation of fuel might offer. The Assistant Secretary of the Navy in a memorandum to the Chief, Bureau of Yards and Docks, United States Navy (see appendix C), stated that "there does not appear to be any Navy requirement at the present time for the provision of additional waterway facilities to support the projected naval air station."

(*g*) Movement of drilling barges or dredges for oilfield development over the waterways is small and any appreciable increase in this movement is not probable.

14. *Vessel traffic.*—(*a*) Vessels which used Bayou Petit Anse, Tigre, and Carlin since 1950 are as follows:

Number of vessel trips

Draft (feet)	1950	1951	1952	1953	1954	1955
10	199	224	261	13	18	
7 to 9	2,488	2,447				
9			619	159	135	39
8			445	315	270	382
7			707	381	38	53
4 to 6	1,782	3,543				
6			278	176	145	109
5			1,849	1,416	2,232	2,608
4			191	1,247	2,153	1,718
3 and less	2,273	2,009	1,633	1,949	824	1,002
Total	6,742	8,223	5,983	5,656	5,415	5,911
Net registered tons	2,061,718	2,019,087	1,607,946	898,382	612,976	853,725

(*b*) The discontinuance of vessels with 10-foot draft and the reduction in the other deeper drafts (7 to 9 feet) is believed attributable to the installation of pipelines which are now handling the bulk of the petroleum produced in this area.

(*c*) Barge traffic over Bayou Carlin consists of single barge tows in practically every instance, with barge sizes ranging from 35 by 195 feet to 26 by 93 feet.

(*d*) Some two-barge tows are handled over Bayou Petit Anse; however, the majority of tows on this waterway are single barge tows. The maximum size barge handled on this bayou is 50 by 290 feet, with the greatest number used being of smaller sizes.

(*e*) No commerce is handled over Bayou Tigre.

(*f*) The trend of barges for liquid cargoes shows a tendency to increase in size; however, this does not appear to be true in the case of dry miscellaneous cargo. It is believed that the smaller 35- by 195-foot barge better meets the requirements for shipment of this tonnage than does the large size barges. In the movement of certain dry cargoes where the volume is unlimited or practically unlimited special size equipment can be developed for its handling. As the amount of tonnage in the movement of salt is definitely limited, and a large percentage of consumers are limited in the amount they can utilize, it is not readily apparent that the demand for 50-foot barges for the movement of salt will increase.

15. *Difficulties attending navigation.*—(*a*) Bayou Tigre is narrow, tortuous, and shallow near the mouth with a controlling depth of 4 feet. Below the town of Erath it is crossed by 4 bridges, one of which is a fixed bridge having a vertical clearance of 6 feet at low water. The limiting horizontal clearance is 15 feet at the bridge over the bayou at mile 3.2.

(*b*) Navigation of Bayou Carlin above the town of Delcambre is limited by the minimum (40-foot horizontal) clearances at the highway

and railroad bridges. The 35-foot barges being moved over the waterway are being loaded to capacity loads and experience no undue hardships because of project dimensions. However, limited mooring facilities in Bayou Carlin at Delcambre result in shrimping boats being tied two or more abreast, creating a hazardous condition for barge tows in the bayou. This is particularly true during periods of small craft and hurricane warnings when fishing vessels must seek inland shelters. During these periods of inclement weather a total of up to 460 shrimping vessels may be moored in the area. These vessels are made up of vessels whose home port is Delcambre plus the itinerant shrimping vessels which might be in the vicinity. On these occasions of bad weather, the mooring facilities at Delcambre are overtaxed and vessels are moored abreast to an extent that the fairway is greatly reduced. During periods of congested mooring barge tows destined principally to or from the Jefferson Island salt mine can navigate only with great risk and temporarily may be prevented from passing. The duration of congested mooring in Bayou Carlin may be as short as 1 day or as long as 5 days, depending upon wind velocity and the time that it takes for the Gulf of Mexico to moderate to a point where shrimp trawling is again possible. The average number of small craft warnings issued by the United States Weather Bureau during the period of 1952 to 1955, inclusive, was 27 per year and the delays to tows were frequent.

(*c*) There are no unusual navigation difficulties on Bayou Petit Anse. The project accommodates the maximum loading of all barges handled.

(*d*) The Avery Canal (McIlhenny Canal) has dimensions in excess of the authorized 5- by 40-foot project except at the bar in Vermilion Bay where groundings and damages to vessels occur frequently because of the inadequate depths for the oversize vessels attempting to use a 5-foot project. Vermilion Bay provides central depths of from 7 to 9 feet, and as the bottom material is soft, fully loaded vessels with drafts of as much as 9 feet navigate the bay at reduced speed in order to avoid the long circuitous routes from the gulf to Delcambre. Passage of these vessels over the bar channel can be made safely only at high tide. During protracted northerly winds, when stages may be reduced as much as 2 feet below normal, the channel is for all practical purposes closed to the large shrimping vessels.

16. *Waterpower and other special subjects.*—Neither waterpower, other water uses, or special subjects are involved in this review survey. No flood problems are known to exist along the streams covered in this review.

PROPOSED SOLUTION AND PROJECT FORMATION

17. *Plan of improvement.*—(*a*) The proposed plan of improvement consists of the construction of a harbor of refuge at the town of Delcambre and the enlargement of Avery Canal in its present location to provide a channel 7 feet deep at mean low gulf level over a bottom width of 60 feet from the Gulf Intracoastal Waterway to the 7-foot depth contour in Weeks Bay.

(*b*) The harbor of refuge at Delcambre would be provided by relocating the 9- by 80-foot Bayou Carlin Channel to the east of its present location near the southern edge at the town of Delcambre (see pl. No. 2), which will improve the alinement for barge tows and permit use of the existing channel for mooring facilities, and excavation of the area between the new and old locations of the channel to a depth of 9 feet below mean low gulf level to provide additional mooring areas. Approximately 925 feet of creosoted timber mooring facilities in the mooring area, generally as shown on plate 2, and the construction of a shell surfaced access roadway about 0.4 mile in length along the west bank of the bayou to the lower limits of the mooring facilities would be provided at local cost. Approximately 6 acres of additional rights-of-way will be required for the construction of the harbor of refuge on Bayou Carlin at Delcambre, La.

(*c*) The harbor of refuge for the fishing vessels will be approximately 1,300 feet long with a width of approximately 200 feet on the upstream end and 125 feet on the downstream end. Timber pile wharves or walkways will extend normal to the shore for the mooring of vessels. Vessels will be moored alongside the wharves, on both sides, with other vessels moored abreast on the outboard sides (see pl. 2). The new mooring facilities will accommodate in excess of 150 average size shrimping boats (50 by 20 feet) when moored abreast in addition to boats that could be moored at existing facilities and along the channel above and below the mooring area without blocking barge traffic.

(*d*) The plan of improvement considered for Avery Canal is enlargement to a bottom width of 60 feet over a depth of 7 feet with a 2-foot overdepth in initial dredging as advance maintenance. This enlargement will be required only in the channelway over the bar in Vermilion Bay and at the junction of the Gulf Intracoastal Waterway (see pl. 2).

(*e*) Local interests requested a new land cut from the Gulf Intracoastal Waterway to Vermilion Bay just west of Bayou Petit Anse at the location shown on plate 1, as an alternative to the enlargement of Avery Canal. This route would be much more expensive to construct as the excavation of 2 miles of new channel would be required. It would cross a shallow lagoon, and depths in the bay at the mouth would be about the same as those at the mouth of Avery Canal. Annual maintenance charges would not be less than those for a channel of the same size in the present location. The saving in the distance between Bayou Petit Anse and Southwest Pass would be between 1 and 1½ miles.

(*f*) Other improvements considered at the request of local interests for existing and prospective commerce, were the enlargement of Bayou Carlin from its mouth to Lake Peigneur to provide a 12- by 125-foot waterway; reconstruction of the railroad and highway bridges over Bayou Carlin at Delcambre to provide a 60-foot horizontal clearance, the minimum width considered adequate for use of 50-foot barges; the enlargment of Bayou Petit Anse from the head of Avery Island to the Gulf Intracoastal Waterway to provide a 12- by 125-foot waterway; and the enlargement of Bayou Tigre below Erath to provide a waterway 9 by 80 feet.

(*g*) The rights-of-way and spoil easements now available for the existing project are sufficient for the requested enlargement of Avery Canal and Bayous Petit Anse, and Carlin as described above. The improvement of Bayou Tigre to 9 by 80 feet would require dredging and spoil easements for construction with boom-type equipment, and construction of 4 highway bridges.

18. *Shoreline changes.*—The proposed improvement will not change existing shorelines.

19. *Required aids to navigation.*—The proposed improvements are located on existing waterways and no change in aids to navigation will be required.

ECONOMIC ANALYSIS

20. *Estimates of first cost.*—(*a*) The estimated first cost of construction of the proposed harbor of refuge and the channel improvements considered herein are shown below.

Feature	Estimated cost		
	Federal	Non-Federal	Total
Harbor of refuge:			
Excavation	$65,000		$65,000
Mooring facilities		$32,400	32,400
Access road		8,000	8,000
Rights-of-way		1,600	1,600
Total for harbor of refuge	65,000	42,000	107,000
Avery Canal: Canal excavation	41,000		41,000
Bayou Carlin:			
Channel excavation	253,000		253,000
Reconstruction of bridges	[1] 461,000	[1] 520,000	981,000
Total for Bayou Carlin	714,000	520,000	1,234,000
Bayou Petit Anse: Channel excavation	329,000		329,000
Bayou Tigre:			
Channel excavation	297,000		297,000
Reconstruction of bridges		[2] 2,585,000	2,585,000
Rights-of-way		25,000	25,000
Total for Bayou Tigre	297,000	2,610,000	2,907,000

[1] Preliminary estimates.
[2] Preliminary estimates (includes salvage for existing bridges).

(*b*) Details of these estimates are contained in appendix A.[1]

21. *Estimates of annual charges.*—(*a*) The estimates of annual charges for each of the improvements considered are shown below. The estimated maintenance costs shown are those in excess of maintenance for the existing project.

Feature	Estimate of annual charges		
	Federal	Non-Federal	Total
Harbor of refuge:			
Interest	$1,630	$1,000	$2,630
Amortization	670	430	1,100
Maintenance		5,700	5,700
Total	2,300	7,130	9,430
Avery Canal:			
Interest	1,020		1,020
Amortization	420		420
Maintenance (increase)	10,000		10,000
Total	11,440		11,440
Bayou Carlin:			
Interest	17,000	13,000	30,000
Amortization	7,000	5,300	12,300
Maintenance	3,000	2,000	5,000
Total	27,000	20,300	47,300
Bayou Petit Anse:			
Interest	8,200		8,200
Amortization	3,400		3,400
Maintenance	1,000		1,000
Total	12,600		12,600
Bayou Tigre:			
Interest	7,400	65,200	72,600
Amortization	3,000	26,800	29,800
Maintenance	4,000	12,000	16,000
Total	14,400	104,000	118,400

(*b*) Details of these estimates are contained in appendix A.[1]

22. *Estimates of benefits.*—(*a*) *Harbor Refuge, Delcambre, La.*—Delcambre, La., is the only major seafood port in the area lying between Cameron, La., and Morgan City, La., a distance of 125 miles. There are approximately 160 shrimping vessels whose home port is Delcambre, La., and which regularly return to Delcambre to dispose of their catch of shrimp to the factories located at that point.

[1] Not printed.

(*b*) During times of inclement weather on the Gulf of Mexico when water conditions are too rough for trawling many shrimping vessels from other ports operating in the gulf area near Deleambre also travel to that port to await more favorable weather conditions. Under such conditions over 300 shrimping vessels arrive at Deleambre to dispose of their catch and to remain inland until the weather in the Gulf of Mexico improves. It then becomes necessary to replenish food, fuel, and ice. Deleambre offers such supply, as well as other facilities for the proper maintenance and servicing of shrimping vessels. An influx of 300 vessels into Deleambre overburdens the existing mooring facilities so that the waterway is made hazardous for navigation by tows and large vessels.

(*c*) It is not necessary for winds to reach hurricane or even gale force to interfere with shrimp trawling in the open Gulf of Mexico. Shrimping is done by vessels towing otter-type trawls. In the otter trawl the net is kept open by two large trawl boards at each side on the front of the net. These boards go down to the gulf floor and hold the net to the bottom. Towing cables are steel cables. As the size of the sea increases the roll of the shrimping vessel increases, and the amount that the trawl boards dig into the bottom fluctuates with the roll of the towing vessel. When rolls become of sufficient severity the board will dig in deep enough to break its tow cable. Thus a complete trawl can be lost or quantities of cable lost. When the seas become of sufficient height to endanger cable and trawls fishing is stopped. Such seas can be caused by winds of from 25 to 30 miles an hour. For these reasons the mooring areas at Deleambre are congested at frequent periods during the year.

(*d*) Congestion in the bayou might be relieved by boats disposing of their partial catches if any at Delcambre and then traveling to another point to moor and replenish supplies. The nearest adequate source of ice, food, and other items of supply is at Abbeville on the Vermilion River, a distance of about 44 miles. A limited source of supplies is or can be made available at Intracoastal City and it would be possible to moor in the Vermilion River at this point. Intracoastal City is about 22 miles from Deleambre.

(*e*) For purposes of estimating benefits, it may be assumed that the 140 transient boats from Deleambre would moor on Vermilion River, near Intracoastal City and at Abbeville. The width of the Vermilion River and its natural depth would allow the mooring of these vessels along the banks without blocking of the channel. An average travel distance of 33 miles is involved or a travel time of 3.3 hours per vessel or 462 hours total. At $1.60 per hour for fuel and additional wear and tear, the total cost would be $740 per occurrence. In the past 4 years a total of 110 small craft warnings have been issued by the Weather Bureau for this area, or an average of 27 small craft warnings annually. The total annual cost to these shrimping vessels would therefore amount to $20,000 annually.

(*f*) *Avery Canal.*—Dragging of vessels through the shoal reach of Avery Canal and across the bar results in excessive wear and some damage to the underwater hull surfaces, shafts, stern bearings, propellers, and rudders, in addition to a loss of time. Estimates of vessel operators of the damage caused by the shallow depths range from $250 to $2,000. Likewise estimates of the amount of time lost due to slow speed in dragging over the bottom in the shallow reaches .

and because of damages extend from about 12 hours to 4 days. As shrimping vessels carry a supply of ice on the outbound trip their drafts are at a maximum on both the outbound and inbound trips, and consequently are handicapped in both directions by the shallow depths prevailing. Damages and delays have been estimated on 14,000 vessel trips annually through the channel with an hourly cost of $7 for operation. Damages and loss of time to these vessels are experienced in varying amounts depending on the size of the vessel. It is estimated that the damage incurred by vessels in negotiating the entrance channel to Avery Canal which can be eliminated by provision of a 7- by 60-foot channel will average $50 a vessel annually. Based on an annual use of the project by 300 trawlers, a total annual expense of $15,000 is estimated under existing conditions. The loss of time through the shallow approach channel to Avery Canal in Vermilion Bay which can be eliminated by the provision of a 7- by 60-foot channel is estimated to be $11,300 annually. The total benefits accruing from the improvement of Avery Canal will be as follows:

Reduction in damages	$15,000
Reduction in lost time	11,300
Total benefits	26,300

(*g*) *Bayou Carlin.*—Proponents of the modification of the existing project on Bayou Carlin to 12- by 125-foot dimensions including alteration of the highway and railroad bridges at Delcambre cited the movement of salt from Jefferson Island as the major reason for modification. The proponents of the improvement state that limited horizontal clearance on the bridges at Delcambre (40.7 feet) restrict barge movements of salt from Jefferson Island. Salt is now being moved from Jefferson Island on common-carrier rates with the same rates applying from Avery and Weeks Islands. The existing waterway is adequate for the barge movement of salt at the most economical published rate, and it is not believed that the volume of salt moving to any one point will be inducive to any large scale contract handling of the movements.

(*h*) Salt from Jefferson Island has been handled in barges 25 by 140 feet; 26 by 175 feet; 35 by 132 feet; and 35 by 195 feet, with about 20 percent of the tonnage being handled in 25- by 140-foot barges with loads of approximately 500 tons and 75 percent in 35- by 195-foot barges averaging 1,450 tons. By comparison salt is also moving from Avery Island on Bayou Petit Anse, and these movements are unrestricted by bridge clearances. The tonnage and dimensions of barges carrying salt from Avery Island over Bayou Petit Anse are shown below for the calendar years 1954 and 1955:

Year	Number of barges	Cargo in tons	Barge sizes (feet)				
			175 by 26	195 by 35	240 by 50	245 by 50	290 by 50
1954	68	83,630	18	40	7	1	2
1955	98	123,968	25	59	14	----------	----------

About 75 percent of this tonnage is handled in barges 35 feet wide or smaller. It is therefore anticipated there will be no increase in the

50-foot barges in the transportation of salt, or other dry commodities that do not move in very great quantity. Rather it is probable that the availability of dry cargo barges in the sizes above 35 feet may even decrease in the future.

(*i*) During the life of the project it may be possible for the tonnage of salt from Jefferson Island to reach or exceed slightly 400,000 tons annually. Of this 400,000 tons annually it might be possible that 25 percent or 100,000 tons could be placed in barges larger than 35 feet, and that tariff or contract rates might even be established for its handling. These estimates are predicated on the assumption that the number of large consumers will increase over the life of the project.

(*j*) The enlargement of the existing project from 9- by 80-foot to a 12- by 125-foot project would result in some benefits to the fully loaded tows now using the waterway by providing an enlarged cross-sectional area, thereby reducing the drag of the tows. While salt is handled out of Jefferson Island in single barges at the present time for consolidation into other tows it is felt that with the expected increase in tonnage two barges will be handled. This would allow a payload of 2,900 tons for a tow of 2 barges. This tow could be propelled about 4.7 miles an hour with a 700- to 800-horsepower towboat and would make 13,630 ton-miles an hour at a total cost of about $30.97 an hour. The cost a ton-mile would be 2.27 mills. With a 12- by 125-foot channel this same tow could make approximately 5.7 miles an hour, which would result in 16,530 ton-miles an hour. At an hourly cost of $30.97 this would amount to a cost of 1.87 mills, which would represent a savings of about 0.40 mill a ton-mile. Based on the existing ton-mileage (326,732) of barge tows on Bayou Carlin this would amount to a savings of $130 for movement in 35- by 195-foot barges on a 12- by 125-foot waterway.

(*k*) If the waterway were improved to 12 by 125 feet and the bridges at Delcambre altered to provide sufficient clearance, a tow of two 50- by 250-foot barges with the same towboat could produce 25,600 ton-miles an hour, which at an hourly cost of $34.67 would amount to 1.35 mills a ton-mile or a savings of 0.52 mill over the cost in 35- by 195-foot barges.

(*l*) The prospective ton-mileage on the waterway during the economic life of the project is estimated to average 2,800,000 ton-miles annually, of which about 700,000 ton-miles would move in 50-foot barges, and 2,100,000 ton-miles would move in 35- by 195-foot barges. This would result in a savings of $840 for movement in 35- by 195-foot barges and an additional savings of $644 for the movement of 700,000 ton-miles in 50-foot barges, or a total of $1,484 for the potential future tonnage between the mine and the Intracoastal Waterway.

(*m*) Additional savings would accrue to the movement of the 100,000 tons carried in 50-foot barges over other inland waterways to its ultimate destination. This would be handled an average distance of 700 miles, 150 miles on the Intraconstal and 550 miles on the Mississippi system. It is further estimated that one-half of the 100,000 tons will move in consolidated tows throughout its course, and that the remaining one-half will move in separate tows on the Intracoastal and be consolidated with other equipment on the Mississippi River. Based on the 0.52 mill saving for the 50-foot barges

moving separately and on a saving of 0.1 mill for the consolidated movements a total overall saving of $10,150 is deduced for this movement. The total savings attributable to the 12- by 125-foot channel including alteration of bridges is $11,634.

(*n*) In addition to salt, other lesser tonnage over Bayou Carlin is composed of shrimp, ice, and shells. Ice carried over the waterway is utilized in preserving the shrimp catch. Vessels used in the fishery range from 80 to 20 feet in length with drafts from 9 to 1.5 feet. Shells handled over Bayou Carlin are used for road construction and repair, and for filling. This commodity is normally handled in 1- or 2-barge tows, with barges of 35-foot width or less. During the period from 1949 through 1955 a total of 59,896 tons of shells were handled over the waterway, or an average of about 8,600 tons a year. Accordingly, no significant benefit would accrue to the movement of shrimp, ice, and shells.

(*o*) No flood-control benefits will accrue to the proposed channel enlargement, nor will it afford any significant relief to the congestion now existing during periods of inclement weather.

(*p*) *Bayou Petit Anse.*—Tonnage over Bayou Petit Anse is composed primarily of petroleum products (gas oil and distillate), crude oil, salt, and gasoline. The gas oil, distillate, crude oil, and gasoline are handled in 35- by 195-foot and 40- by 205-foot barges in 2- and 3-barge tows. The salt is moved over Bayou Petit Anse in barges 26 by 175 feet; 35 by 195 feet; 50 by 240 feet; and 50 by 290 feet. During the year 1955, 25 bargeloads of salt were moved in 26- by 175-foot barges; 59 bargeloads in 35- by 195-foot barges; and 14 bargeloads in 50- by 240-foot barges. Salt tows are 1-barge tows, primarily due to the volume of salt moving rather than the inability of the project to handle 2 barges.

(*q*) Bayou Petit Anse from its junction with Bayou Carlin to Avery Island handled about 1,200,000 ton-miles. On the basis of the 0.40 mill per ton-mile saving, the 12- by 125-foot project would provide a savings of $480 annually for this reach of Bayou Petit Anse. Bayou Petit Anse from its junction with Bayou Carlin to the Intracoastal Waterway handled about 974,000 ton-miles which would result in a savings of $390 annually on the same basis.

(*r*) The increased ton-mileage on Bayou Petit Anse from its junction with Bayou Carlin to Avery Island will average 2,277,000, and the ton-mileage over Bayou Petit Anse from its junction with Bayou Carlin to the Intracoastal Waterway would average 3,491,000 during the life of the project. The provision of a 12- by 125-foot channel and the use of 35- by 195-foot barges would allow the following annual savings:

Bayou Petit Anse from its junction with Bayou Carlin to Avery Island	$910
Bayou Petit Anse from its junction with Bayou Carlin to the Intracoastal Waterway	1,400

The total potential savings on Bayou Petit Anse therefore amount to $2,310 annually.

(*s*) No flood-control benefits will accrue to the proposed channel enlargement.

(*t*) *Bayou Tigre.*—Existing tonnage on Bayou Tigre is small and the probability of development of additional tonnage on an improved waterway on the bayou very remote. Benefits would be negligible.

23. *Comparison of benefits and costs.*—The estimated benefits, annual charges and benefit-cost ratios for the improvements considered are as follows:

Feature	Estimates		
	Annual benefits	Annual charges	Benefit-cost ratio
Harbor of Refuge	$20,000	$9,430	2.1
Avery Canal	26,300	11,440	2.3
Bayou Carlin	11,634	47,300	.25
Bayou Petit Anse	2,310	12,600	.18
Bayou Tigre	(1)	118,400	(2)

[1] Negligible.
[2] Not computed.

COORDINATION AND LOCAL COOPERATION

24. *Proposed local cooperation.*—Substantial local participation in the harbor of refuge is indicated since a large part of benefits from the harbor will be local in character. It is considered that for the harbor of refuge the local interests should construct and maintain the access roads and mooring facilities, perform maintenance dredging between the realined channel and the mooring facilities, and regulate the use and development of the harbor area in addition to the requirements for all improvements proposed, that local interests will hold and save the United States free from damages due to construction and maintenance of all the works, provide the right-of-way and spoil disposal necessary for construction and maintenance of the improvements, and make any changes in any utilities, pipelines, or transmission lines necessary for construction of the improvement. The Town Council of Deleambre by resolution dated October 11, 1956 (appendix D), agreed to provide the necessary local cooperation.

25. *Apportionment of costs among interests.*—The apportionment of costs between the Federal Government and local interests in accordance with the proposed local cooperation above is shown in the estimates of first costs and annual charges, paragraphs 20 and 21 above and in appendix A.

26. *Coordination with other agencies.*—(*a*) The State of Louisiana, Department of Public Works, submitted a brief at the public hearing requesting construction of all the improvements being considered herein. This agency also cooperated in securing data for use in the study. The officials of the town of Deleambre also supported the improvements requested at the public hearing.

(*b*) The United States Fish and Wildlife Service in cooperation with the Louisiana Wildlife and Fisheries Commission submitted a report on the fish and wildlife aspects of the improvements requested at the public hearing. This report is attached hereto as appendix B. These agencies specifically requested that Avery Canal be enlarged in its present location rather than relocated and that spoil disposition be made in a manner favorable to wildlife resources. These requests are in accordance with the recommended plan of improvement.

(*c*) A representative of the State of Louisiana, Department of Highways, presented a statement at the public hearing requesting that all of the cost of alteration of their highways and/or highway bridges be

provided by the Federal Government. There are no bridges or roads affected by the recommended improvements.

(*d*) Many speakers at the public hearing stated that substantial benefits would be obtained from transportation of fuel and other materials destined for the proposed naval air station to be constructed near New Iberia, La. The Assistant Secretary of the Navy advised that additional waterway facilities are not required.

(*e*) The town of Delcambre has agreed to provide the recommended local cooperation for the harbor of refuge.

RESULTS OF THE INVESTIGATION

27. *Discussion.*—(*a*) The project is located in the coastal marsh area of south central Louisiana close to the Gulf of Mexico. Storms and/or strong winds create dangerous conditions in open waters making it necessary for boats of the shrimping fleet to seek safe anchorage where they will be able to dispose of the catch and reoutfit and resupply prior to departing for the shrimping areas.

(*b*) The town of Delcambre is the major shrimp market and supply point between Morgan City and Lake Charles. To reach this town, the boats must cross Vermilion Bay and traverse the Avery Canal, Bayou Petit Anse, and Bayou Carlin. After reaching Delcambre, the catch is disposed of and the boats normally are tied up along the banks of Bayou Carlin.

(*c*) Bayou Carlin is also one of the waterways over which salt is barged from the mine at Jefferson Island. During inclement periods the shrimp boats obstruct the channel sufficiently to make passage of the barges destined to and from the salt mine hazardous or impossible. A safe harbor for anchorage of the shrimping fleet is necessary and can best be provided by realinement of Bayou Carlin near the south edge of Delcambre and using the existing channel for construction of mooring facilities with an access road from Highway 90 at Delcambre, La.

(*d*) The estimated benefits from the proposed harbor of refuge are $20,000 annually and the estimated annual charges are $9,430, of which $6,730 would be borne by local interests. The governing body of the town of Delcambre has agreed to provide the local cooperation for this improvement.

(*e*) Shrimp boats engaged in fishing in the Gulf of Mexico and Vermilion Bay pass through the Avery Canal and the existing 9- by 80-foot channel on Bayous Petit Anse and Carlin to reach the market and supply point at Delcambre. The existing project dimensions on Avery Canal are 5 by 40 feet. The controlling depth in Vermilion Bay varies from 7 to 9 feet. Depths in excess of 9 feet exist in the canal, except for short stretches at each end and through the bar in Vermilion Bay, where the project depth of 5 feet is currently being maintained. These boats, which have drafts of as much as 7 to 9 feet when fully loaded, frequently drag bottom and suffer substantial damage to the underwater sections and the cooling systems. A deeper channel is needed and it is considered feasible to maintain a channel not in excess of 7 feet through the bar over a bottom width of 60 feet. This can be provided at an initial cost of $41,000, with annual charges of $11,440, of which $10,000 is for increased cost of maintenance, bringing the total estimated annual maintenance cost to $13,000 for the enlarged canal. The estimated annual benefits, $26,300, consist

of $15,000 from reduction in damages and $11,300 from reducton in delays awaiting favorable water levels for passage through the canal.

(*f*) Local interests requested the enlargement of the existing 9- by 80-foot project on Bayous Petit Anse and Carlin to 12 by 125 feet, including reconstruction of the railroad and highway bridges at Delcambre to accommodate 50-foot barges. Increased movement of salt is cited as justification therefor. The existing project is adequate for 35-foot barges with loads in excess of 1,000 tons. The increased loading and faster speeds that would obtain with the improved channel and bridges would produce savings representing only a small part of the annual charges of the improvements. The estimated annual benefits to be obtained from enlargement of Bayou Carlin to 12 by 125 feet, $11,634, compared to estimated annual charges of $47,300, giving a benefit-cost ratio of 0.25. The estimated annual benefits to be obtained from the enlargement of Bayou Petit Anse to 12 by 125 feet, $2,310, is only 0.18 of the annual charges of $12,600.

(*g*) At the present time there is practically no waterway traffic on Bayou Tigre. The area is served by a network of improved roads and the development of traffic on an improved waterway is considered to be very improbable. Further, the cost of the requested improvement is very high because of the several bridges required. Annual charges for the improvements considered are estimated to be $118,400. Benefits have not been estimated, but they would be very small.

CONCLUSIONS

28. *Conclusions.*—(*a*) A suitable anchorage area at Delcambre is necessary for use of the shrimping fleet during periods of adverse weather, and a harbor of refuge can be provided at a reasonable cost. The benefits from such a harbor are in excess of the annual charges.

(*b*) The authorized project for Avery Canal is inadequate for the existing traffic. A depth in excess of 7 feet below mean low gulf level exists in the present waterway except at both ends where the depth is 5 feet. Improvement of the channel to dimensions of 7 by 60 feet is necessary and justified by the benefits.

(*c*) The requested enlargement of Bayou Carlin and Bayou Petit Anse from the existing authorized dimensions of 9 by 80 feet to 12 by 125 feet is not justified.

(*d*) The prospective traffic for movement over the requested 9- by 80-foot waterway on Bayou Tigre falls far short of justifying the annual costs for excavation of the waterway.

RECOMMENDATIONS

29. *Recommendations.*—It is recommended that the existing project for Bayous Petit Anse, Tigre, and Carlin be modified to provide a harbor of refuge at Delcambre and a channel at Avery Canal 7 feet deep at mean low gulf level over a bottom width of 60 feet at an estimated first cost to the United States of $106,000 and an estimated annual maintenance cost of $10,000 in addition to that required for maintenance of the existing project, subject to the provisions that local interests shall:

(*a*) Provide, without cost to the United States, all lands, easements, and rights-of-way necessary for construction of the project modifications and for their subsequent maintenance when and as required.

(*b*) Hold and save the United States free from damages due to the construction and maintenance of the project modifications.

(*c*) Provide and maintain without cost to the United States necessary mooring facilities and an access roadway in the harbor of refuge area open to all on equal terms in accordance with the plans approved by the Chief of Engineers, and to perform maintenance dredging between the realined channel and the mooring facilities.

(*d*) Establish a competent and properly constituted public body empowered to regulate the use and development of the harbor of refuge facilities with the understanding that said facilities will be open to all on equal terms.

WILLIAM H. LEWIS,
Colonel, CE, District Engineer.

[First Endorsement]

OFFICE, DIVISION ENGINEER,
LOWER MISSISSIPPI VALLEY,
CORPS OF ENGINEERS,
Vicksburg, Miss., March 13, 1957.

Subject: Review of Reports on Bayous Petit Anse, Tigre, and Carlin, La.

To: The Chief of Engineers, Department of the Army.

The findings and recommendations of the district engineer are concurred in.

JOHN R. HARDIN,
Major General, USA, Division Engineer.

APPENDIXES

REPORT OF UNITED STATES FISH AND WILDLIFE SERVICE

DEPARTMENT OF THE INTERIOR,
FISH AND WILDLIFE SERVICE,
OFFICE OF REGIONAL DIRECTOR,
Atlanta, Ga., July 6, 1956.

DISTRICT ENGINEER,
Corps of Engineers, United States Army,
New Orleans, La.

DEAR SIR: This letter constitutes a preliminary report by the Fish and Wildlife Service on plans being studied by the Corps of Engineers for further navigational development of Bayous Petit Anse, Tigre, and Carlin, La. These comments were prepared in cooperation with the Louisiana Wild Life and Fisheries Commission and are submitted pursuant to the act of August 14, 1946 (60 Stat. 1080).

The stream system under study is located in Iberia and Vermilion Parishes, La. Bayou Petit Anse flows southward to enter the Intracoastal Waterway south of Avery Island. Bayou Carlin is its major tributary, joining the parent stream at about mile 2.5. Bayou Tigre is tributary to Bayou Carlin at about mile 3.5. Upper reaches of these streams drain prairie lands largely devoted to agricultural use. Lands along lower reaches are characterized by a high, well-drained, brackish marsh and this is the area generally to be affected by the project under study.

According to your letter of March 6, 1956, improvements being considered are as follows:

1. Enlargement of the existing project on Bayou Petit Anse and Carlin to a 125-foot width at elevation 12.0 feet below mean low gulf level. The existing project applies to the lower 6.1 miles of Petit Anse and the lower 7.6 miles of Carlin.

2. Enlargement of Bayou Tigre to provide a bottom width of 80 feet at elevation 9.0 feet below mean low gulf level from Bayou Carlin to 6.4 miles to Erath, La.

3. Construction of a new channel 60 feet wide at a depth of 9.0 feet below mean low gulf level between the Gulf Intracoastal Waterway and Vermilion Bayou at a location about 1 mile west of the intersection of Bayou Petit Anse and Intracoastal Waterway.

4. Construction of highway and railroad bridges at Delcambre, La., to provide a horizontal clearance of 100 feet.

5. Construction of a harbor of refuge on the east bank of Bayou Carlin at about mile 6 to accommodate approximately 450 commercial fishing boats.

Wildlife values are moderate in the marsh. According to investigations conducted by the Louisiana Wild Life and Fisheries Commission, this general area is at present producing a fur harvest valued at approximately $50,000. Fur values in the past have been as high as $500,000, but existing drainage and navigation projects have seriously altered habitat conditions to the detriment of fur animals. Game animals such as deer and rabbits are plentiful, and waterfowl utilize the area in moderate numbers. However, hunting is restricted by poor accessibility. Fish harvest is negligible.

Provision of a new channel from the Intracoastal Waterway to Vermilion Bay as provided by the proposed project would have a serious effect upon fish and wildlife resources. Opening of a new channel into this marsh would accentuate the problem of excessive drainage and tidal fluctuations, which is presently holding wildlife values below the potential of the area. Enlargement of channels and other navigation features of Bayous Petit Anse, Tigre, and Carlin would not seriously detract from existing fish and wildlife values of the area.

Project construction would provide opportunity to improve habitat conditions in the marsh area for fur animals. Spoil deposition along the bayous could be utilized to retard drainage and minimize tidal effects. Personnel of the Louisiana Wild Life and Fisheries Commission have consulted a number of landowners whose lands would be affected and they are agreeable to the improvement of their lands as fur-animal habitat.

On a preliminary basis the desired result would be achieved by placement of spoil in continuous levees along both banks of the channels and by plugging tributary drains originating within the marsh interior. Specific plans for placement of spoil in the interest of wildlife resources should be made as detailed engineering data become available.

Therefore, the Fish and Wildlife Service, in cooperation with the Louisiana Wild Life and Fisheries Commission, recommends that (*a*) consideration be given to provision of an adequate outlet from the Intracoastal Waterway to Vermilion Bay by enlargement of the existing Avery Canal rather than construction of a new channel, (*b*) that spoil deposition be made in a manner favorable to wildlife resources as discussed above, and (*c*) that conservation agencies be notified and be given adequate opportunity to consult with the planning agency during the detailed planning stage and during construction of features of the project important to fish and wildlife resources.

Please advise me of your views and proposed action on the above recommendations.

Sincerely yours,

WALTER C. GRESH, *Regional Director.*

MEMORANDUM FROM ASSISTANT SECRETARY OF THE NAVY

JUNE 14, 1956.

MEMORANDUM FOR CHIEF, BUREAU OF YARDS AND DOCKS

Subject: Corps of Engineers, United States Army Hearing on Bayous Petit Anse, Tigre, and Carlin, La., held in Delcambre, La., on February 24, 1956

Reference: (a) DPWO Eighth NavDist ltr DB–100/IMS/hs Serial PW–2592 of March 2, 1956, with enclosures and endorsements thereto

1. The Chief, Bureau of Aeronautics, on the basis of a study made by the Bureau, has advised me that the existing waterway facilities terminating at Dennison, La., will be adequate to handle future shipments of fuel and other supplies for the projected naval air station at New Iberia, should the Navy construct the necessary connecting facilities. The proposed improvements to the waterway facilities terminating in the Lake Pigneur are no closer to New Iberia than the terminal of the existing waterway at Dennison. Therefore, there does not appear to be any Navy requirement at the present time for the provision of additional waterway facilities to support the projected naval air station.

2. I request that you advise the Corps of Engineers, United States Army, accordingly.

R. H. FOGLER,
Assistant Secretary of the Navy (Material).

RESOLUTION OF THE TOWN OF DELCAMBRE, LA.

RESOLUTION

Be it resolved by the Town Council of the Town of Delcambre, Iberia Parish, La., in regular session convened, That this town council hereby endorses the project of the New Orleans District of the Corps of Engineers of the United States Army for the improvement of Bayou Carlin and Avery Canal and for the construction of a harbor of refuge in Bayou Carlin at Delcambre;

Be it further resolved, That the United States be and is assured that all servitudes and rights-of-way necessary in connection with the said work will be furnished and made available by this council, and that this council will likewise provide the necessary local financial assistance and other necessary and customary local cooperation when and as requested.

I hereby certify the above and foregoing to be a true and correct extract of the minutes of the meeting of the Town Council of the Town of Delcambre, held on the 11th day of October 1956.

JOLIN D. LEBLANC,
Secretary, Town of Delcambre, La.

○

CORPS OF ENGINEERS

U.S. ARMY

BAYOUS PETIT ANSE, TIGRE AND CARLIN LOUISIANA

GENERAL MAP

SHEET 1 OF 2 SHEETS

SCALES AS SHOWN

OFFICE OF THE DISTRICT ENGINEER, NEW ORLEANS, LA., FEB. 1957

SUBMITTED	APPROVAL RECOMMENDED	APPROVED
Jerome E. Bacle	Gerry H. Hudson	William H. Lewis
CHIEF, PLANNING AND REPORTS BRANCH	CHIEF, ENGINEERING DIVISION	COL., C.E., DISTRICT ENGINEER

DRAWN	TRACED	CHECKED	TO ACCOMPANY REVIEW OF REPORTS	FILE NO.
E.M.A.	D.G.B.	P.V.Y.	DATED: 21 FEBRUARY 1957	H-2-20503

LEGEND

PLAN OF IMPROVEMENT

- Channel realignment
- Channel enlargement
- Harbor of refuge
- Route of alternate outlet channel suggested by Louisiana Department of Public Works

IMPROVEMENTS BY LOCAL INTERESTS

- Lateral canal

- Oil field
- Gas field
- Oil and gas field

VICINITY MAP

SCALE OF MILES 20 0 20 40 60

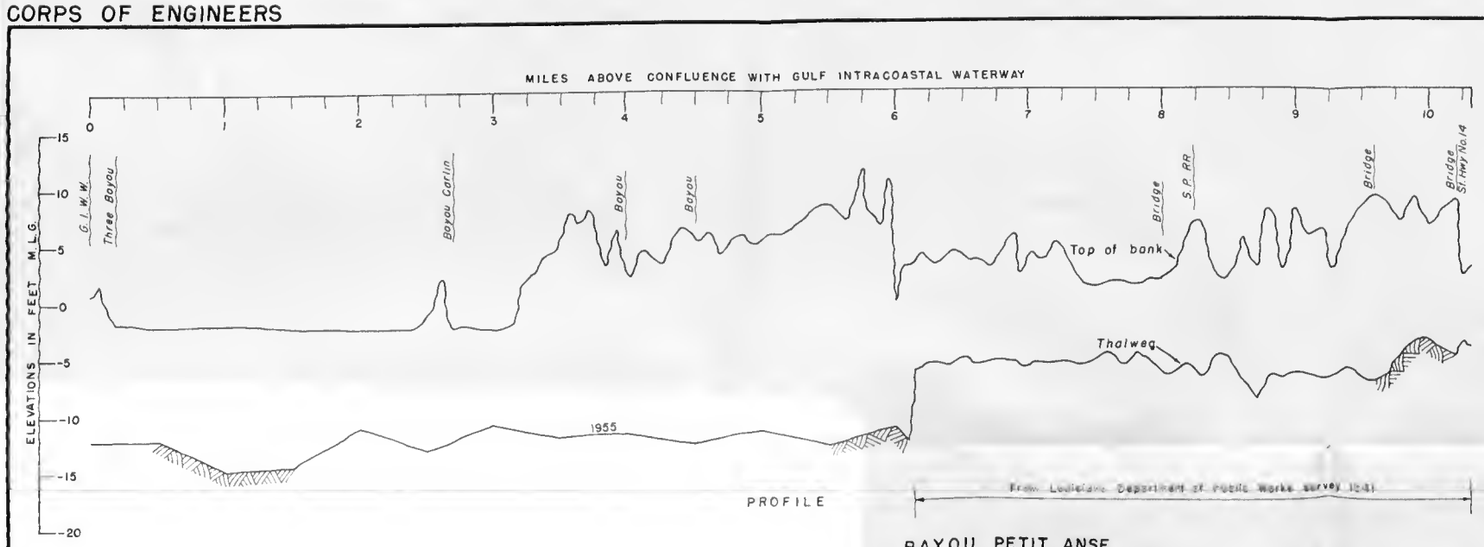
PROJECT AREA

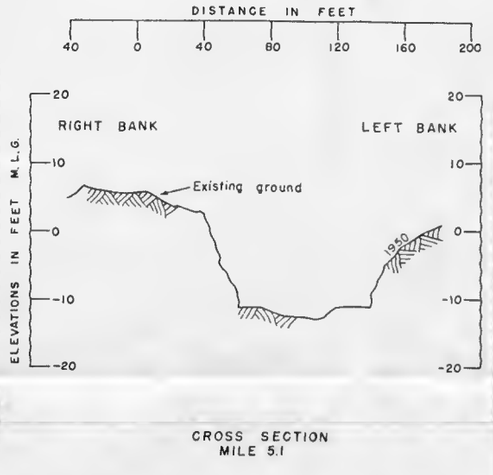
PLATE I

25315 O-58 (Follows text) No. 1

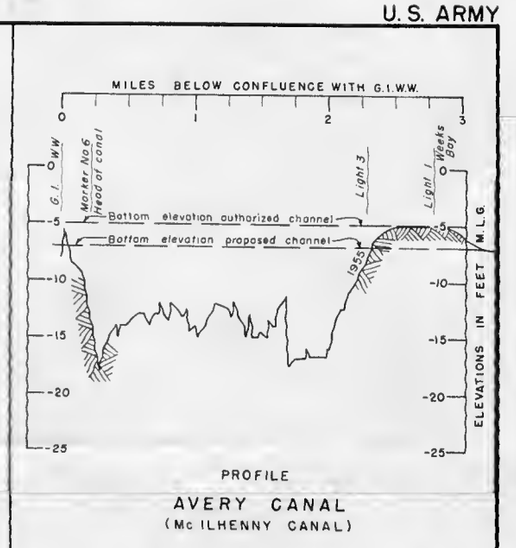
CORPS OF ENGINEERS

U. S. ARMY

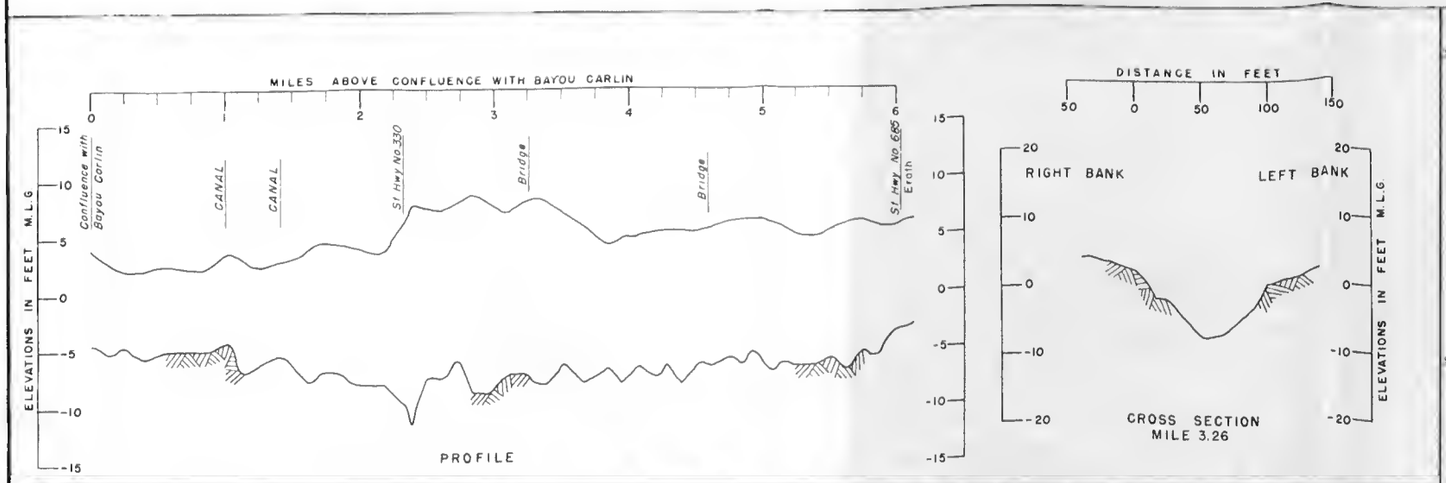




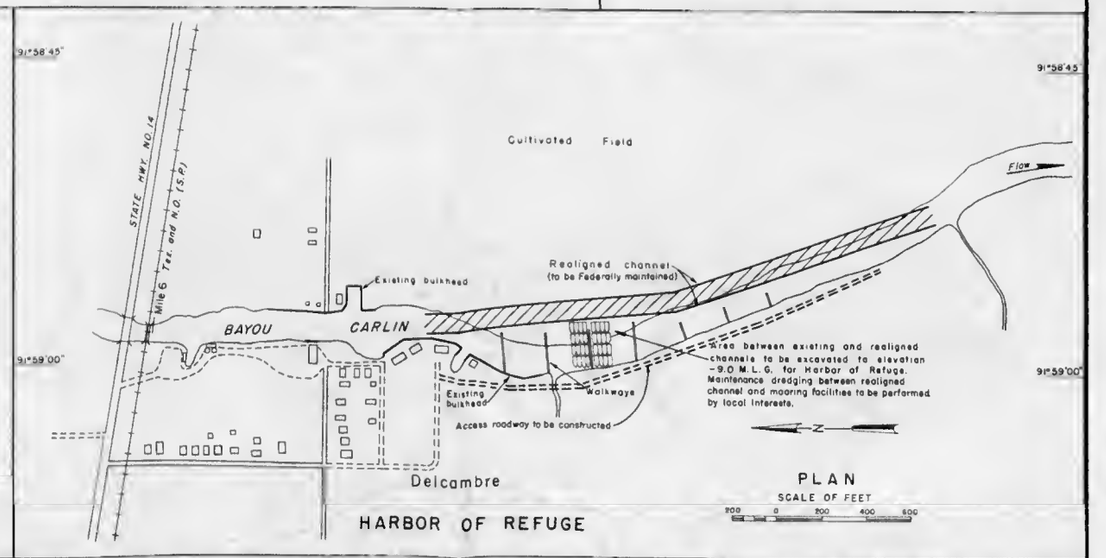
BAYOU PETIT ANSE



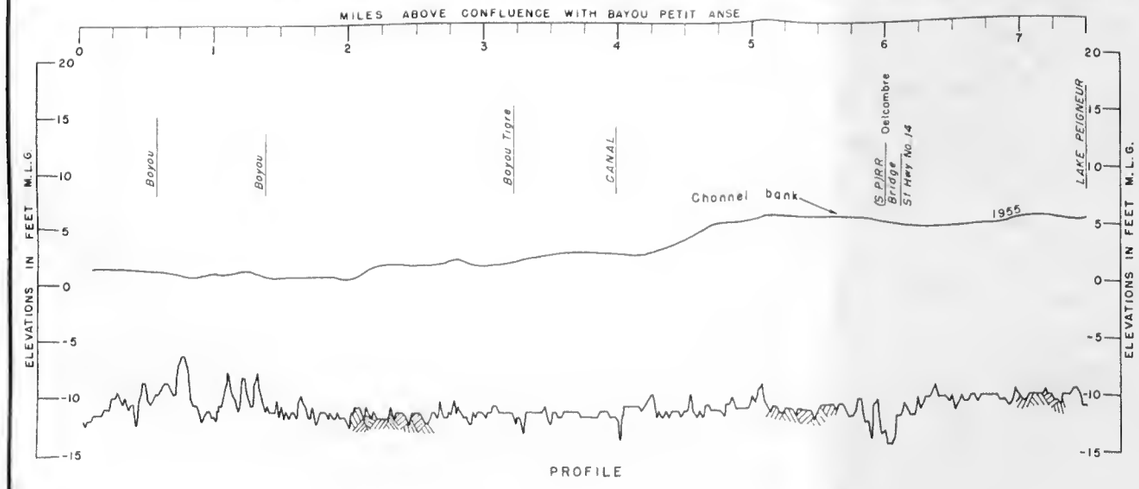
AVERY CANAL
(Mc ILHENNY CANAL)

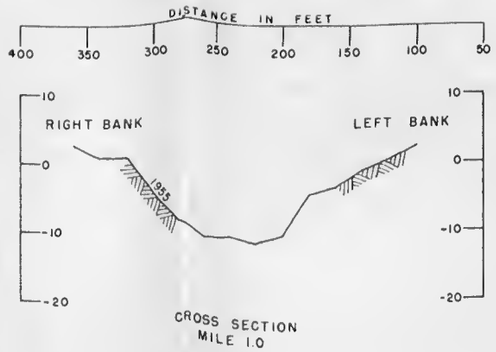


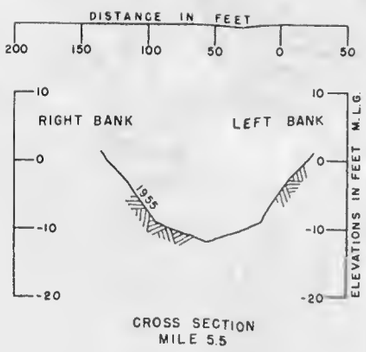
BAYOU TIGRE



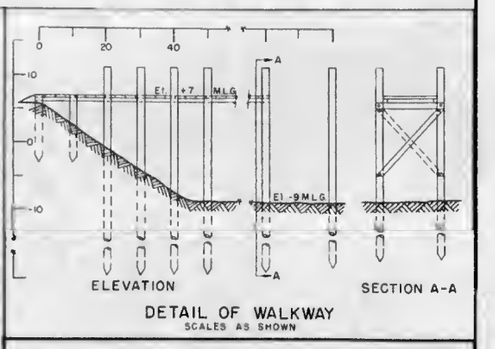
HARBOR OF REFUGE







BAYOU CARLIN



DETAIL OF WALKWAY
SCALES AS SHOWN

BAYOUS PETIT ANSE, TIGRE AND CARLIN
LOUISIANA

PLAN, PROFILES AND CROSS SECTIONS

SHEET 2 OF 2 SHEETS
SCALES AS SHOWN
OFFICE OF THE DISTRICT ENGINEER, NEW ORLEANS, LA., FEB. 1957

SUBMITTED	APPROVAL RECOMMENDED	APPROVED
Jerome C. Baecher	George H. Hardin	William N. Leaché
CHIEF, PLANNING AND REPORTS BRANCH	CHIEF, ENGINEERING DIVISION	COL., C.E., DISTRICT ENGINEER

DRAWN	TRACED	CHECKED	TO ACCOMPANY REVIEW OF REPORTS	FILE NO.
E.M.J.	B.C.B.	P.V.Y.	DATED: 21 FEBRUARY 1957	H-2-20503

25315 O-58 (Follows text) No.2

PLATE 2